

Compact Spectrometers Based on Linear Variable Filters

Completed Technology Project (2015 - 2016)



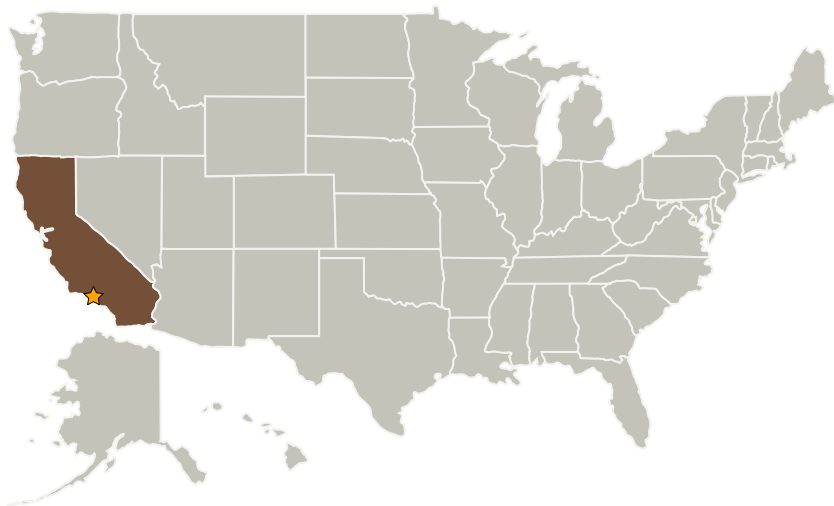
Project Introduction

Demonstrate a linear-variable spectrometer with an H2RG array. Linear Variable Filter (LVF) spectrometers provide attractive resource benefits – high optical throughput with minimal mass & volume and no moving parts. However LVF spectrometers have not been shown to meet the specific needs of astronomy which are much different from planetary mapping applications. Therefore we propose to demonstrate its use for astronomy at system level including: Spectral passband uniformity and blocking; Control of ghost reflections; Control of spectral curvature (aka 'smile'); Stable response needed to stitch spectra together. Program leverages existing hardware from CIBER2 project: Hawaii-2RG array; Cryogenic f/3 telescope; Readout electronics; Optical collimator; Spectrometer; Large integrating sphere.

Anticipated Benefits

Potential follow-on application include: CIBER2 will using 3 LVFs to study the absolute extragalactic background light spectrum on a NASA sounding rocket, and demonstrate for space. SPHEREx is a NASA SMEX mission recently selected for step 2. SPHEREx will use 4 large-area LVFs to produce spectra at 6" resolution over entire sky. LVF spectrometers ideal for numerous space astronomy applications due to simplicity and minimal resource requirements.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Center Innovation Fund: JPL CIF

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
California Institute of Technology(CalTech)	Supporting Organization	Academia	Pasadena, California

Primary U.S. Work Locations

California

Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

Project Management

Program Director:

Michael R Lapointe

Program Manager:

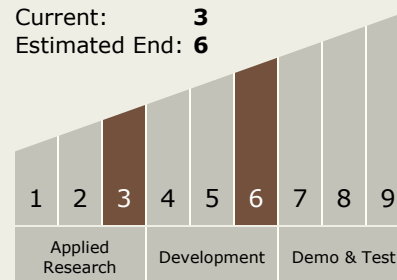
Fred Y Hadaegh

Principal Investigator:

James J Bock

Technology Maturity (TRL)

Start: 3
 Current: 3
 Estimated End: 6



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - TX08.1 Remote Sensing Instruments/Sensors
 - TX08.1.1 Detectors and Focal Planes